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1. STANDARD

1.1. Summary of Standard Changes

1.2. Purpose

The purpose of the following emergency procedures is to describe the steps that should be taken in the case of an emergency situation for the activation of the Uninterrupted Power System (UPS) and Halon fire suppressant system.

1.3. Scope

The following procedures detail the steps to be taken in the event of an emergency situation that may require system activation of the UPS or Halon System.

1.4. Responsibilities

1.4.1 ISD authorized Data Center personnel – those employees working in the computer room during any and all shifts.

1.5. Definitions and Abbreviations

APS – Arizona Public Services, electricity supplier
ISD – Information Services Division
UPS – uninterrupted power supply

1.6. Description of Standards

When an emergency situation occurs in the ISD Data Center, authorized personnel need to be aware of emergency procedure steps to take. These procedures include:

1. Uninterrupted Power Supply.
2. Resetting the remote control box.
3. Resetting the Liebert Control panel
4. Scada Generator alarms.

1.7. References

1.8. Attachments

1.9. References

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2. UNINTERRUPTED POWER SUPPLY PROCEDURES

2.1. Summary of Procedure Changes

2.2. Procedure Details

The IBM is now up and running on the UPS system. This system will allow the IBM to continue running should there be an APS electrical interruption. The automatic switchover to the battery powered UPS will be transparent to the IBM hardware. Once the APS power is restored, the reverse will occur.

The following processes may take place during a power failure:

1. A power interruption occurs.
2. System automatically switches to the battery powered UPS.
3. Generator initiates within 1 minute.
4. Switch occurs from battery power to generator.
5. Power is restored.
6. System automatically switches from generator to APS power.
7. Generator stops.

> **Caution:** Should the UPS fail, bring up the load (power) on bypass. This means that before you try and power up the PDU's and the IBM system, the UPS must be set to bypass. The PDU's in the computer room contain very large transformers. Bringing up the main input breakers on the front of the PDU energizes these transformers with approximately 1,000 amps of inrush current. This inrush is detected as an overload at the UPS. Failure to bring up the UPS on bypass mode can result in damage to the UPS.

2.3. References

2.4. Attachments

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3. RESETTING THE REMOTE CONTROL BOX PROCEDURES

3.1. Summary of Procedure Changes

3.2. Procedure Details

The remote control box is located behind the ADOA cartridge drives.

3.2.1. Press Alarm Silence, this will silence the alarm. Make note of any lights that are on.

3.2.2. Press Lamp Test/Reset. All lights should come on then go off when you release the button.

3.2.3. Check the lights. The only light that should be on is the top light "Load on UPS." If any other lights are on there is a problem. Go to the basement and check the front panel of the Liebert unit. If you are unable to find the problem, call Liebert. The contact phone number is in the vendor on-call book at the Help Desk.

3.3. References

3.4. Attachments

4. RESETTING THE LIEBERT CONTROL PANEL PROCEDURE

4.1. Summary of Procedure Changes

4.2. Procedure Details

The Liebert control panel is located in the basement on the front of the Liebert unit.

4.2.1. Look at the display to see where the open circuit is located. The open circuit should be on the bypass circuit. If not, then you must reset the Liebert unit.

4.2.2. Press the Select button, this will display the menu panel.

4.2.3. Using the down arrow, go to "Load Transfer Procedures."

4.2.4. Press the Select button. Check the voltage in the first two columns. The UPS voltage **must be** higher than the bypass voltage in both columns. If not, then you must increase the UPS voltage. To increase the voltage, use the small black knob at the right of the panel. Push the large outer ring down. While holding the outer ring down, turn the small, inner ring ¼ turn to the right. Release the large outer ring and check the voltage again after 5 seconds. If the voltage on the UPS is still not above the bypass, repeat the above procedure.

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4.2.5. When the voltage on the UPS is above the bypass, on the side panel, press and hold the Control Enable, and press UPS. You should hear a heavy click inside the unit. Press Select and it will go back to the menu.

4.2.6. With the menu on monitor/mimic display, press Select again, to take you back to the display. The open circuit should now be on the bypass circuit.

4.3.   References

4.4.   Attachments

5.   SCADA GENERATOR ALARMS PROCEDURE

5.1.   Summary of Procedure Changes

5.2.   Procedure Details

The Scada system receives real time data from 3720 ACM devices located in the two service entrance sections (SES 1 and SES 2), the generator switchgear, and the output. This configuration gives those knowledgeable in power systems the data necessary to analyze the source of problems experienced in the system at any given time. There are numerous parameters being monitored by these devices and many generate alarms that are logged to the global log and can be viewed and acknowledged in the global event viewer. For power related alarms, the best advice is to have them reviewed by a qualified person to determine if there is a problem that needs attention.

Power failures will generate alarms that can be used to determine the source of the failure (utility or in-house). A qualified person should review the data.

The following is a list of alarms associated with the generators that are of concern for operations personnel and the appropriate response. Alarms displayed in red on the monitor are urgent and require that the proper management be notified. The list includes a brief explanation of the alarms.

Engine under rpm	Note: Urgent if generator is supposed to be running
Engine oil pressure	Note: Urgent if generator is supposed to be running
Over/under water temperature	
Over exhaust temperature	
Fuel filter DP	
Day tank 1 low	
Day tank 2 low	
Main fuel tank hi hi	
Main fuel tank hi	
Main fuel tank low	
Main fuel tank leak	

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All alarms can be viewed and acknowledged in the global event viewer by an operator with the proper Security level. Generator and fuel tank alarms can be viewed in a custom screen that is accessed from the main network screen by clicking on the icon labeled Generator Alarm. Below is a list of the alarms on this page and their expected state, however, all alarms must be acknowledged from the global event viewer.

Engine under rpm

> The under engine rpm alarm is active on each generator when it is not running. It will be logged in the global event viewer and the engine under rpm indicator on the Generator alarm page will be red. When the generators turn on, the alarm is tripped because of the change in rpm. This happens on start up and shut down of generators. The alarm is never tripped if generators are not running, only if rpm is out of range. The same applies for oil pressure

Under oil pressure

> The under oil pressure behaves like the under rpm alarm. It is active when the generators are not running and should be in a normal state when the generators are running.

Over water temperature

> If the water temperature (coolant) of the engine is high it will log an over water temperature alarm in the global event log and the indicator on the generator alarm page will turn red.

Under water temperature

> The under water temperature alarm will only be seen when the generator is not running. It is an indication that a block heater is not functioning properly or has failed. This alarm is logged in the global event log, but does not have an alarm on the generator alarm page.

Over exhaust temperature

> An over exhaust temperature alarm indicates that the exhaust temperature is too high, with the current load on the generators it is unlikely that this alarm will be seen. It will be logged in the global event log and the indicator on the generator alarm page will turn red.

> ** Every Sunday morning a generator test is performed. **
> ** During this time, several alarms will be triggered.   **

Fuel filter DP

The fuel filter DP (differential pressure) alarm is an indication that the fuel filter needs to be changed. It is logged in the global event log and an indicator for this alarm on the generator alarm page will turn red.

Day tank 1 low

Each generator has a small fuel tank which has a capacity of approximately 100 gallons called a day tank. This tank is automatically filled from the main fuel tank as needed. There are two pumps on each day tank for redundancy, however if there is a failure of both pumps or the control circuits controlling them, the tank could run out of fuel and the generator connected to it would stop. This alarm is logged in the global event log and an indicator on the generator alarm page will turn red if the day tank reaches a low level.

Day tank 2 low

The alarm is the same as Day tank 1 low alarm, but it is for generator 2.

Main fuel tank hi hi

This is an indication that the main fuel tank is at its highest level before overfilling will occur. This alarm may be seen when the main tank is being filled to its highest capacity in anticipation of the generators being needed for an extended period of time. This alarm is logged in the global event log and an indicator on the generator alarm page will turn red.

Main fuel tank hi

The main fuel tank hi alarm is an indication that the main fuel tank is at its normal full capacity. This alarm is a pre-indication that the hihi alarm is being approached and overfilling is near.

Main fuel tank low

This alarm is an indication that the main fuel tank is about to run out of fuel. If this happens, the generators will run on the remaining fuel in their day tanks and at that time they will stop. This alarm is logged in the Global event log and an indicator on the generator alarm will turn red.

Main fuel tank leak

The main fuel tank is of dual wall construction and there is a leak detector between the outer and inner walls of the tank. If there is a leak in the inner tank, a sensor will detect the leak and report it to the Scada system. The leak will not be visible at the tank due to the outer wall acting as a retention device. If there is a leak it will be logged in the global event viewer and an indicator on the generator alarm page will turn red.

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Miscellaneous alarms

There are two other alarms that are generated by the Status input of the 3720 ACM on the UPS output.

1. A/C 17 in the UPS room is monitored for alarms through its common alarm relay. Any alarm on the a/c unit will be reported to the Scada system and logged in the global event log. The type of alarm will have to be determined from the digital display on the a/c unit. This a/c unit cools the UPS and battery room and is critical to the operation of the UPS.

***** Notify management of this problem *****

Screen print of Scada generator alarms is included below.

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2. Halon fire suppression system procedures. The following procedures should be adhered to upon hearing the pre-alarm bell.

1. Upon hearing the pre alarm bell, go to the control panel and depress the alarm silence button.
2. Check the smoke annunciator for the location of the detector that has gone into alarm status:

    yellow = ceiling   red = under floor

3. Check the affected area for any signs of fire (smoke, flames, etc.).
4. If a fire is present, determine if the fire extinguishers can be used. If the fire can be extinguished, turn key to off position to stop halon discharge.
5. If the fire extinguishers cannot be used, manually discharge the halon and leave the immediate area closing the doors behind you.
    Be Aware - Halon is five times heavier than air and will follow you out if the doors are not closed.

************ I M P O R T A N T ***********

IF YOU ARE IN THE COMPUTER ROOM WHEN THE HALON IS DISCHARGED, VISIBILITY WILL BE LIMITED. THE HALON GAS WILL BE DISCHARGED FOR APPROXIMATELY 8 SECONDS. IT IS BEST TO WAIT UNTIL THE HALON HAS STOPPED DISCHARGING BEFORE LEAVING THE AREA

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6. If the horn goes off due to a second detector, you must immediately depress the abort switch to ensure that the halon is not discharged until the exact problem can be determined. If a second detector is in alarm status the time delay is 30 seconds, before the halon discharges.

7. If the halon has been discharged the sound horn/ light will be affected. The sound/horn light is located inside the door leading to the main computer room. When the light is lit and the horn is sounding, this means that the halon has been discharged.

8. Anytime the fire alarms in the computer room go off, it affects the fire alarms in the building.

Halon Suppression System Alerts

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The following is a list of events that occur when the halon suppression system is in an active state of being discharged.

Alarms - any single detector going into alarm will:

1) Illuminate the red LED on the base of the detector.
2) Illuminate the alarm LED on the control panel.
3) Sound a pre-alarm bell in a steady ringing.

A second detector on the opposite detection loop will:

1) Illuminate red LED on base detector.
2) Sound horn/light.
3) Start time delay.

Time delay - (30 seconds) seen on digital readout will:

1) Start at time set and proceed to zero for discharge. Upon expiration of the time delay, the halon will be released into the protected area.

Manual release - lift protection cover and push toggle switch up. This will:

1) Immediately release halon into protected area.
2) Override any time delay or abort condition.
3) Sound pre-alarm bell and discharge horn/light
4) Actuate all close and shutdown functions.

Trouble - LED's and buzzer which indicate a problem:

1) general trouble (LED)
2) panel trouble (LED)
3) ground fault (LED)
4) battery trouble (LED)

Abort - lift protection cover up and hold switch up. This will:
1) restart time to original timer delay. Manual station can be activated at any time to discharge system.

Reset - momentarily depress the system reset switch on control panel.

Halon control panel location:

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Following is a floor plan showing location of the different control panel components:
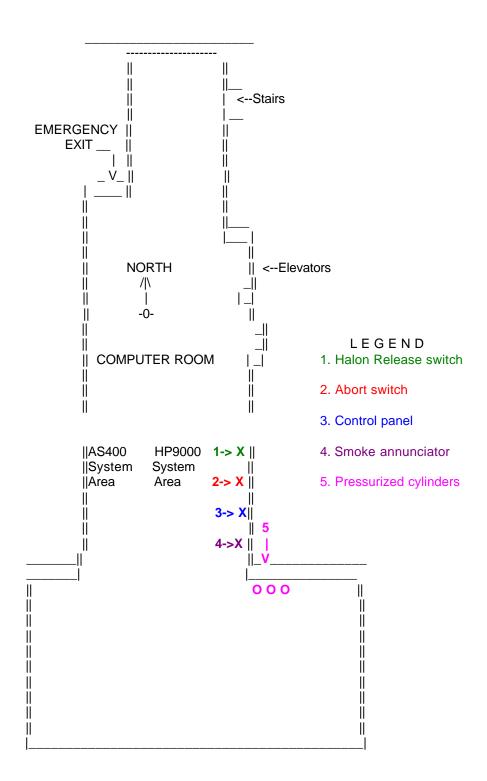
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                          ||                   |    <--Stairs
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           EMERGENCY      ||                   ||
           EXIT __        ||                   ||
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            | ____ ||                          ||
            ||       ||                        ||
            ||       ||                        ||
            ||       ||                        ||___
            ||       ||                        |___ |
            ||       ||                            ||
            ||    NORTH                 ||  <--Elevators
            ||      /|\                 _||
            ||       |                 | _|
            ||      -0-                  ||
            ||                          _||            L E G E N D
            ||                          _||
            || COMPUTER ROOM          | _|     1. Halon Release switch
            ||                          ||
            ||                          ||     2. Abort switch
            ||                          ||
            ||                          ||     3. Control panel
   |                                          4. Smoke annunciator

            ||AS400    HP9000   1-> X ||       5. Pressurized cylinders
            ||System   System         ||
            ||Area     Area     2-> X ||
            ||                         ||
            ||                  3-> X||
            ||                         ||  5
            ||                  4->X ||  |
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